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CONVOY COMPANY

RESULTS OF JOINT GROUNDWATER SAMPLING WITH VAN WATERS AND ROGERS AT THE CONVOY SITE PORTLAND, OREGON

FEBRUARY 3, 1992

Brown and Caldwell
Consultants

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February 3, 1992

Ms. Patty Schnegg
Knapp, Marsh, Jones, and Doran
515 South Figuero Street
Los Angeles, California 90071

13-5918-03

Subject: Results of Joint Groundwater Sampling With Van Waters and Rogers at the Convoy Site, Portland, Oregon

Dear Ms. Schnegg:

On March 29, 1991, Brown and Caldwell personnel collected groundwater samples from five monitoring wells at the former Convoy Company (Convoy) site and from four monitoring wells at the Van Waters and Rogers (VWR) site in northwest Portland, Oregon. This work was completed according to the scope of work as stated in the March 27, 1991, Agreement for Engineering Services between Brown and Caldwell Consultants and John Gohlieb, William L. Melamed, and Peter Gearin Properties Partnership (GMG). A concurrent groundwater sampling was conducted by Harding Lawson Associates (HLA) from monitoring wells at both the former Convoy and VWR sites. HLA is currently retained as an environmental consultant by VWR. Concurrent sampling, by HLA of former Convoy site wells, and by Brown and Caldwell Consultants of VWR wells, was conducted according to the March 25, 1991, verbal agreement between GMG Properties and VWR. Information concerning groundwater contamination on the VWR site was obtained from the June 7, 1991, Progess Report XVIII, Van Waters and Rogers, Inc.

Prior to sampling, the five Convoy monitoring wells were surveyed by a HLA subconsultant surveyor on March 28, 1991. The purpose of this survey was to correlate water level measurements from Convoy wells with VWR wells. All groundwater samples collected by Brown and Caldwell Consultants were analyzed for chlorinated solvent concentrations. This letter report presents sampling results and interpretations of collected data.

SITE DESCRIPTION AND LOCATION

The Convoy site previously was used as a truck terminal and trailer fabrication facility until January 1, 1990. The site is presently leased to Container Recovery Corporation and used as a recyclable metal and glass beverage container storage and shipment facility. The location of this site is shown on the vicinity map (Figure 1).

Land use in the area is industrial, shipping, and commercial. VWR operates a chemical stabilization, storage, and recycling facility west of the former Convoy site. A freight transportation yard is located to the south. A roofing material manufacturer and a supply distributor warehouse are located to the east; the Burlington Northern Railroad and Port of Portland shipping yard are to the north, across Yeon Avenue.

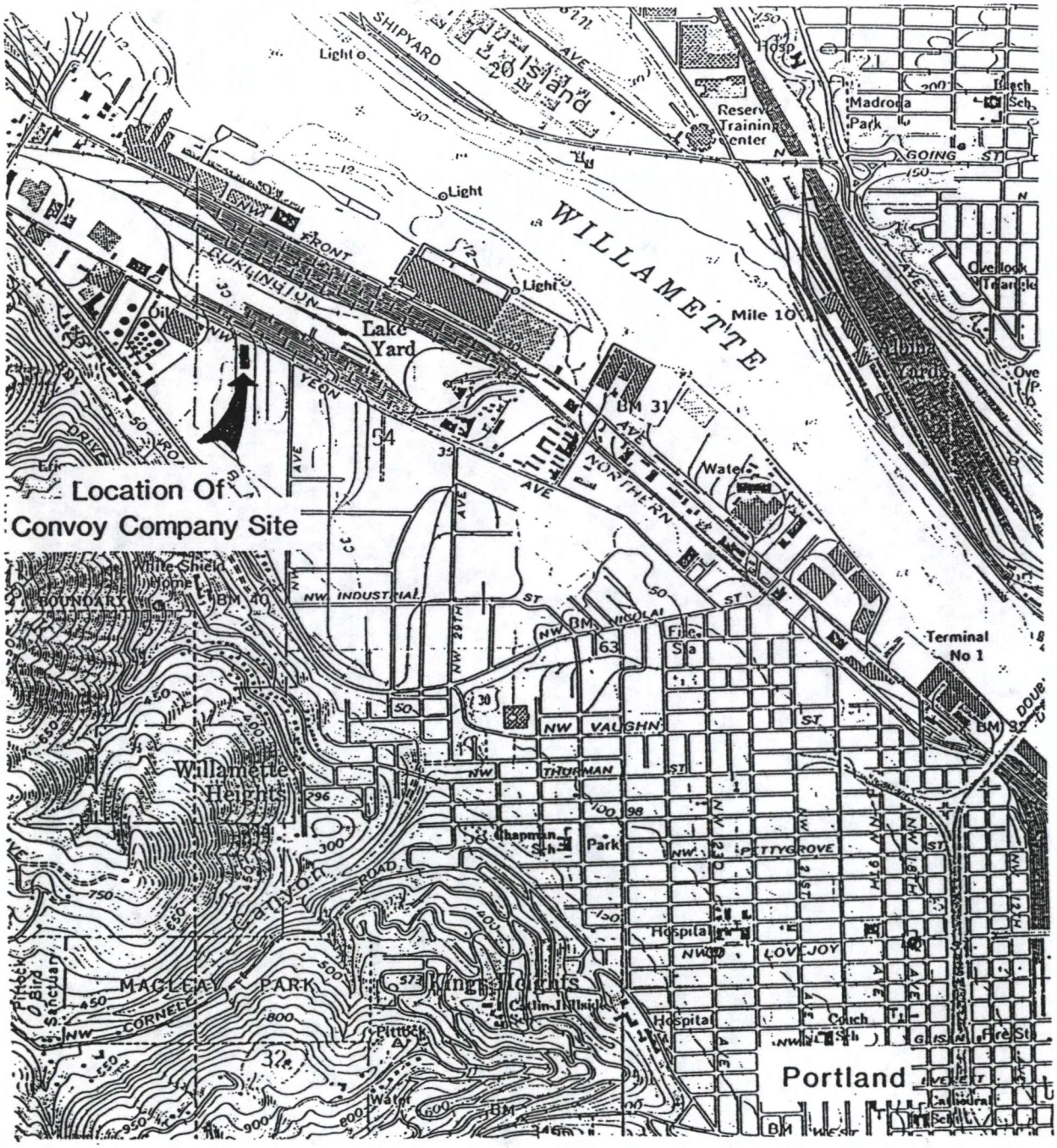
PREVIOUS GROUNDWATER INVESTIGATIONS

During a groundwater investigation, five groundwater monitoring wells were installed at the Convoy site on April 6, 1990, to an average depth of approximately 20 feet below grade. Depth to groundwater ranged from 6.14 to 8.13 feet below the top of casing (TOC). The groundwater investigation at the Convoy site was conducted subsequent to the soil investigation in association with the removal of two underground storage tanks (USTs) containing diesel motor fuel, motor oil, waste oil, and the remediation of contaminated soil. The diesel USTs were formerly located south of monitoring wells W-4 and W-5, and the motor and waste oil USTs were located near monitoring well W-3. In addition, a dry well was located adjacent to the waste oil UST.

Groundwater samples were collected on April 9, July 12, and October 31, 1990. Results of these sampling episodes are summarized in the April 10, 1991, *Convoy Company Quarterly Sampling Results, July and October 1990, Portland, Oregon*, by Brown and Caldwell.

FIELD INVESTIGATION

Brown and Caldwell personnel conducted concurrent groundwater sampling of nine monitoring wells with HLA personnel on Friday, March 29, 1991. Five of these monitoring wells are located at the former Convoy site and four are at the VWR site (Figure 2).



SOURCE:
USGS 7.5 MINUTE SERIES
(TOPOGRAPHIC) 1977
PORTLAND QUADRANGLE

SCALE 1:24,000

FIGURE 1

Location of Convoy Company Site

Yeon Ave. Portland, Or.

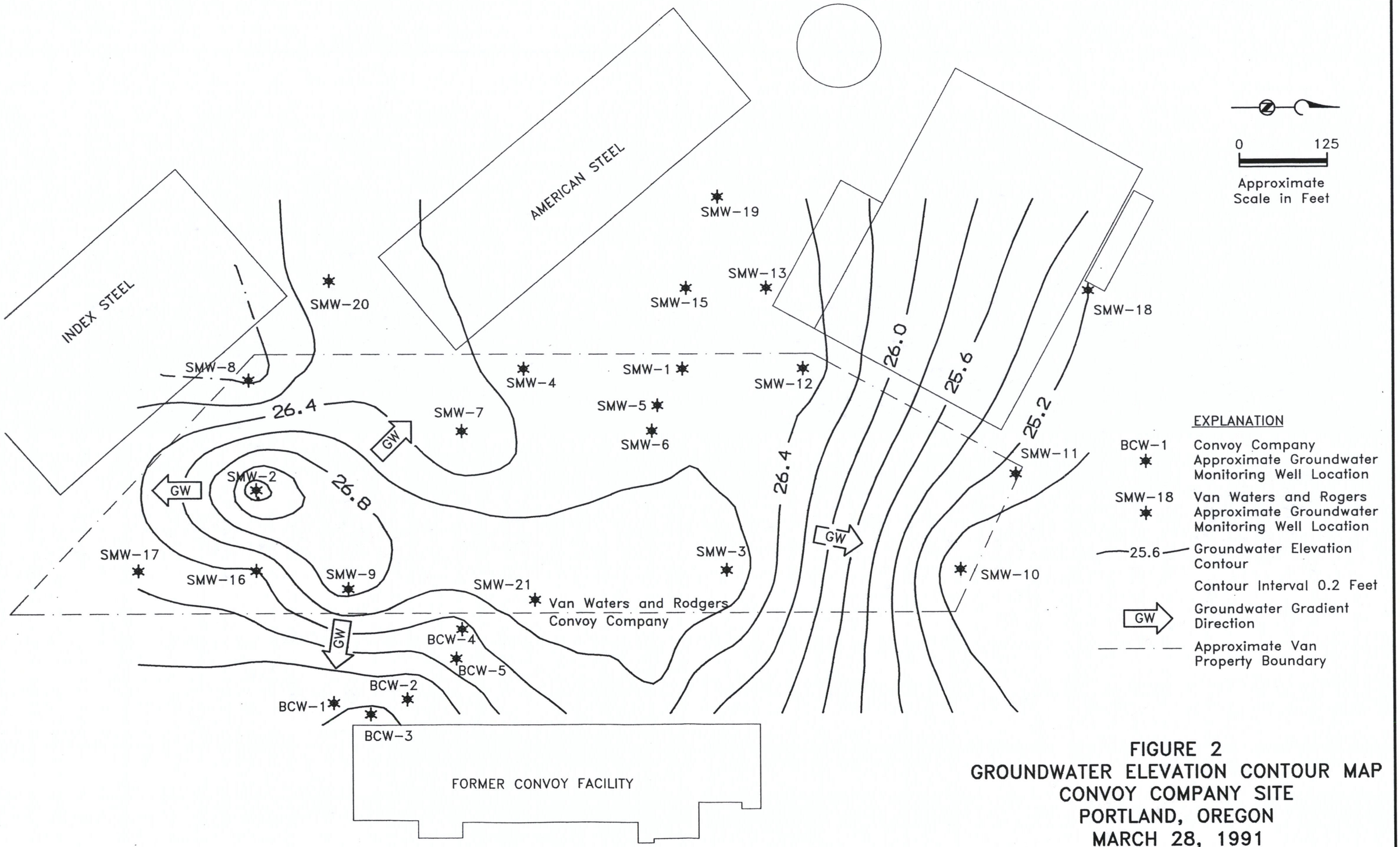


FIGURE 2
GROUNDWATER ELEVATION CONTOUR MAP
CONVOY COMPANY SITE
PORTLAND, OREGON
MARCH 28, 1991

Field Activities

This section presents the field activities during the concurrent groundwater sampling conducted by Brown and Caldwell for Convoy and HLA for VWR. Field activities consisted of obtaining static water-level measurements from all Convoy and VWR groundwater monitoring wells, collecting of groundwater quality parameter field measurements during the purging process, and collecting samples for analytical evaluation. Methods used during the field work are presented in Attachment 1. The methods described in Attachment 1 include the well purging process, sample collection and management, field measurement techniques, and equipment decontamination.

Groundwater Field Measurements. March 29, 1991, static water-level measurements were determined by a water-level probe indicating depth to groundwater relative to a TOC survey mark. The TOC elevations for all the Convoy and VWR monitoring wells were surveyed on March 28, 1991. HLA provided the water level data used for contouring; this data is presented in Attachment 2. Groundwater measurements of the Convoy and VWR monitoring wells were made within a one-hour period to minimize possible influences from daily tidal and barometric fluctuations. The probe was decontaminated between monitoring wells for each static water-level measurement. Groundwater contours for both sites are shown in Figure 2.

Groundwater measurements taken on the VWR and Convoy sites indicate that the groundwater gradient on the eastern VWR boundary is directly east towards the Convoy site. The groundwater contour map for the site indicates the presence of a groundwater mound on the south central portion of the VWR site. The groundwater elevation for SMW-2 is 27.31 feet above mean sea level, while the elevation above mean sea level for the closest monitoring well, SMW-16 (located 110 feet to the south), is 26.34 feet - a difference of approximately 1 foot. The source of the water that has created the groundwater mound is not known. However, field observations of the surface indicate the presence of a water main. The main supplies water to fire hydrants and is oriented parallel to a line drawn from well SMW-9 and SMW-2 and to the groundwater mound axis. The mounding appears to be related to a ridge of groundwater oriented east-west under the southern half of the VWR site. The groundwater flow gradient is in all directions from this ridge to the VWR property boundary. The steepest flow gradient quadrant extrapolated from the monitoring wells on the VWR site is towards the east. The groundwater east of the VWR groundwater mound indicates an average flow gradient towards the former Convoy site of 0.83 percent or about 44 feet per mile (ft/mi). Conversely, the groundwater to the west of the mound indicates a relatively average shallow flow gradient of 0.22 percent or about 12 ft/mi to the west and southwest. North of the mound the groundwater indicates an average flow gradient of 0.76 or about 40 ft/mi to the north.

A total of eleven groundwater monitoring wells were purged and sampled on March 29, 1991, including five Convoy wells and six VWR wells. Convoy wells were purged by Brown and Caldwell using a stainless steel bailer. Groundwater was purged from VWR wells by HLA using a four-inch Gould® down-hole pump equipped with PVC discharge casing. Groundwater purging from all wells continued until the field water quality measurements temperature, pH, and electrical conductivity stabilized or until the well was pumped dry. Field parameter measurements of purged water from wells sampled by Brown and Caldwell Consultants are summarized in Table 1.

Table 1. Field Groundwater Quality Data, March 29, 1991, Former Convoy Site

Well No.	Temperature, centigrade	pH	Electrical Conductivity[a]	Volume purged, (gallons)
W-1	14.7	6.4	580	6.5
W-2	14.5	6.4	320	10.0
W-3	15.1	5.1	300	6.2
W-4	14.5	6.4	740	6.5
W-5	14.8	6.4	530	6.5
SMW-3	15.5	5.6	145	11
SMW-9	NR	NR	320	15
SMW-16	NR	NR	NR	NR
SMW-21	15.0	5.9	160	19

a Measured in 4 Semiens per centimeter. ^{3}
NR Denotes measurement not recorded by Brown and Caldwell personnel.

Sample Collection, Handling, and Management

After 80 percent static water-level recovery, groundwater samples from all Convoy wells (W-1 to W-5) were collected by Brown and Caldwell Consultants, with HLA as an observing party, by submerging a disposable polyethylene bailer into the lower-most portion of water present in the well. Water samples from six VWR wells were collected by HLA by submerging a stainless steel bailer into the bottom of each well, with Brown and Caldwell Consultants as an observing party. All samples were transferred from the bailers directly into the sample bottles with minimal agitation.

The sample bottles were immediately stored in an iced cooler and transported to the project laboratory under chain-of-custody procedures. A copy of the chain-of-custody document is included in Attachment 3.

ANALYTICAL RESULTS

Brown and Caldwell collected groundwater samples from five Convoy wells (W-1 to W-5) and four of the six VWR wells (SMW-3, SMW-9, SMW-16, and SMW-21). This section discusses the analytical results of eleven groundwater samples including nine groundwater samples, one duplicate sample, and a travel blank submitted by Brown and Caldwell Consultants.

Nine of the eleven groundwater samples (W-1 through W-5, SMW-3, SMW-9, SMW-16, and SMW-21) were submitted to Pacific Environmental Laboratory (PEL) in Beaverton, Oregon. Two of the eleven groundwater samples, one a duplicate sample from well W-5 and the other a travel blank, were submitted to Analytical Technologies in Renton, Washington.

Groundwater Sample Analytical Results

Each of the eleven groundwater samples was analyzed for chlorinated solvents by Environmental Protection Agency (EPA) Method 8240. Three (3) samples from W-3, W-4, and W-5 were analyzed for total petroleum hydrocarbons by EPA Method 418.1. One sample, W-3, was analyzed for hydrocarbon identification by gas chromatography/flame ionization detector. A summary of analytical results is presented in Table 2.

Analytical Results Summary

Concentrations of volatile organic compounds and chlorinated solvents were detected in groundwater samples collected on both sites. On the Convoy site, the highest concentrations of volatile organic compounds and chlorinated solvents were detected in monitoring wells W-4 and W-5, the two wells located adjacently east of the VWR site. Monitoring wells W-1 through W-3 are located approximately 200 feet southeast of W-4.

The concentrations of volatile organic compounds and chlorinated solvents detected in monitoring wells SMW-3, SMW-9, SMW-16, and SMW-21 on the VWR site were relatively lower than the concentrations detected in groundwater samples from the Convoy site. Elevated concentrations of 2-butanone and ethanol were detected using EPA Method 8240 in monitoring well W-3 located on the Convoy site. These compounds were not targeted by previous analytical methods (EPA Method 8010 and 8020) used for samples collected from prior sampling episodes. Samples were collected from the four monitoring wells on the VWR site located near the boundary between VWR and the Convoy site.

Table 2. Summary of Groundwater Sample Analytical Results[a]
March 29, 1991, Former Convoy Site

Organic Compounds	Former Convoy Site Wells						Van Waters and Rogers Site Wells			
	W-1	W-2	W-3	W-4	W-5	W-5d[b]	SMW-3	SMW-9	SMW-16	SMW-21
TPH	--	--	ND	ND	ND	--	--	--	--	--
HCID	--	--	56[c]	--	--	--	--	--	--	--
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	11	ND
2-Butanone	ND	ND	910	ND	ND	ND	ND	ND	ND	ND
1-1-Dichloroethane (DCA)	41	1,300	ND	14,000	9,500	ND	19	12	ND	27
cis 1-2-Dichloroethene (DCE)	ND	160	ND	14,000	7,300	10,000[d]	160	21	ND	18
Methylene Chloride						13,000[e]				
Ethanol (Dichloromethane)	ND	ND	68,000	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	ND	ND	ND	ND	ND	2,100	44	ND	ND	ND
Toluene	ND	ND	ND	4,900	4,900	6,400	ND	ND	ND	ND
1,1,1-Trichloroethane (TCA)	ND	ND	ND	130,000	74,000	180,000	ND	ND	ND	ND
Trichloroethane (TCE)	ND	ND	ND	12,000	11,000	1,800	41	ND	ND	ND
Trichlorotrifluoroethane (Freon 113)	ND	ND	ND	20,000	ND	11,000[f,g]	ND	ND	ND	ND

a Refer to laboratory analysis report for individual laboratory detection limits, all analytical results in parts per billion (ppb).
b Sample W-5d analyzed by Alchem Laboratories.
c Hydrocarbon in the range of gasoline and ethanol.
d Represents total of 1, 2-DCE isomers.
e Compound identified in blank at a concentration of 8 ppb.
f Estimated concentration.
g Compound identified in reagent blank at an estimated concentration of 13 ppb.
ND Not detected.
-- Not analyzed.

Analytical Result Evaluation

Compound concentrations identified by analysis of groundwater samples, submitted by Brown and Caldwell Consultants, are evaluated by comparison to the US Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCL). The following section provides an evaluation for samples from Convoy and VWR monitoring wells.

Convoy Well Sample Result Evaluation

Analytical results of groundwater samples from Former Convoy site wells W-2, W-4, and W-5, identified cis-1,2-dichloroethene (DCE) at concentrations of 160, 14,000, and 7,300 parts per billion (ppb), respectively. Analytical results of a duplicate sample (32291-5-5154) from well W-5 also identified DCE at a concentration of 10,000 ppb. These concentrations exceed DCE of 70 ppb.

Toluene concentrations of 4,900 ppb identified in samples from wells W-4 and W-5, and 6,400 ppb in the W-5 duplicate sample exceed the EPA MCL of 2,000 ppb.

Analysis of the W-5 duplicate sample (32991-5-5154) by Analytical Technologies identified tetrachloroethene (PCE) at a concentration of 2,100 ppb. Analysis of sample W-5 performed by PEL did not identify PCE at or above a method detection limit of 2,500 ppb. The EPA MCL for PCE is 5 ppb.

Analysis of samples from W-4 and W-5 identified 1,1,1-trichloroethane (TCA) at concentrations of 130,000 ppb and 74,000 ppb, respectively. Analysis of the W-5 duplicate sample identified TCA at a concentration of 180,000 ppb. Concentrations of TCA identified in samples W-4, W-5, and W-5d exceed the EPA Maximum Contaminant Level (MCL) of 200 ppb. Analytical results also identified trichloroethene (TCE) in samples W-4, W-5, and W-5d at concentrations of 12,000, 11,000, and 1,800 ppb, respectively. The EPA MCL for TCE is 5 ppb.

Van Waters and Rogers Sample Result Evaluation

Analysis of sample SMW-16 identified a benzene concentration of 11 ppb which exceeds the EPA MCL of 5 ppb for benzene. Well SMW-16 is located about 200 feet southwest of Convoy wells W-4 and W-5.

Analysis of sample SMW-3 identified a DCE concentration of 160 ppb, a PCE concentration of 44 ppb, and a TCE concentration of 41 ppb. The concentrations of DCE, PCE, and TCE identified from SMW-3 analysis exceed the EPA MCLs of 70, 5, and 5 ppb, respectively. Well SMW-3 is located approximately 300 feet northwest of Convoy wells W-4 and W-5.

Conclusions

Volatile organic compounds and chlorinated solvents were detected in groundwater samples collected from both the Convoy and VWR site. Contamination was detected in two separate areas, in samples for wells on the Convoy property located adjacent to the VWR site and from wells located on the eastern half of the VWR site. The concentrations of volatile organic compounds and chlorinated solvents detected in the VWR wells are larger than concentrations detected in water samples collected from wells located on the Convoy site. (Progress Report XVIII, Van Waters and Rogers, Inc., June 7, 1991).

The two areas of contamination are separated by a groundwater mound ridge that appears to originate from the vicinity of monitoring well-SMW-2 located on the VWR site. The source of this ridge is unknown, possible sources include water mains, stormwater collection systems, or a water line supplying a nearby fire hydrant.

The effect of this groundwater ridge could be two-fold; first the introduction of clean water could displace and/or dilute contaminated groundwater and second, a groundwater ridge with this configuration would create a gradient that would move contaminated groundwater from the western portion of the VWR site onto the Convoy site.

We feel that the source and effects of this groundwater mound and its possible effect on groundwater contamination will need to be addressed by Van Waters and Rogers.

If you should have any questions regarding this report, please call me at (503) 244-7005.

Very truly yours,

BROWN AND CALDWELL

Jonathan L. Sprecher, RG
Project Manager

JLS:ljw

cc: Mr. David Ax, Ryder Automotive Carrier Division
Mr. Michael Fernandez, Department of Environmental Quality
Mr. Bruce Long, Environmental Protection Agency
Mr. Kevin Schanihek, Environmental Protection Agency

ATTACHMENT 1

ATTACHMENT 1

FIELD METHODS FOR CONCURRENT GROUNDWATER SAMPLING FOR VAN WATERS AND ROGERS AND FORMER CONVOY SITES

The field work performed during groundwater sampling work at the former Convoy Company (Convoy) and the Van Waters and Rogers (VWR) sites required the sampling of nine groundwater monitoring wells. These sampled wells included five Convoy site wells (W-1 through W-5) and four VWR wells (SMW-3, SMW-9, SMW-16, and SMW-21). Samples from the Convoy wells were collected by Brown and Caldwell Consultants (BCC) while duplicates were given to Harding Lawson Associates field staff. VWR well samples collected by Harding Lawson and Associates (HLA) were duplicated and given to BCC personnel. BCC personnel observed HLA sampling methodologies during VWR groundwater collection, and HLA observed BCC sampling methods during Convoy water sample collection. All water samples collected from groundwater monitoring wells were subject to total volatile organic analysis.

Well Elevation Survey

The well top of casing (TOC) elevation of each Convoy monitoring well was determined by a HLA sub-consultant surveyor. The Convoy well TOC elevations were tied into the established TOC elevations of VWR monitoring wells. The methods used by the surveyor are not known because BCC personnel were not present during the survey process. The TOC elevations for all Convoy and VWR wells are presented in Attachment 2. The horizontal relationship between the Convoy and VWR wells is not known.

Static Water-Level Measurements

Depth to water was measured with an electric water-level-measuring instrument relative to the surveyed elevation marked at the TOC. These data were recorded to the nearest 0.01 foot.

Well Purging Process

Wells were purged prior to sampling to remove groundwater which had been exposed to atmospheric conditions and to draw fresh formational water into the casing. BCC used a stainless steel bailer to purge approximately three well volumes from Convoy wells. A well volume is defined as the amount of groundwater in the well casing. HLA used a Gould® submersible pump attached to PVC casing to either remove three well volumes or pump the well dry. The pH, temperature, and electrical conductivity were measured after removal of each well volume during bailing and pumping.

Purging produced in the range of 6 to 10 gallons of water from each Convoy well. Water from Convoy well purging was transferred to a 55-gallon Department of Transportation (DOT) approved drum. The drum was labeled and sealed and is stored at the facility. Purge water from VWR wells was also placed in 55-gallon DOT barrels and then stored on the VWR site. A total of about 36 gallons of purge water from Convoy wells is pending disposal to a US Environmental Protection Agency (EPA) approved treatment, storage, and disposal facility is pending.

Groundwater Sampling

BCC groundwater samples from Convoy wells were obtained from a bottom-emptying device attached to the base of a polyethylene disposable bailer. After 80 percent of static water-level recovery, the bailer was submerged to the bottom of the monitoring well to collect the sample. A polyethylene bottom-emptying, volatile organic compound sampling device allowed a steady unagitated flow of the groundwater sample from the bailer into a 40-milliliter (mℓ) boro-silicate bottle. A Teflon-lined cap (septa) was placed on each bottle, and each bottle was checked to ensure no headspace remained within the sample.

Each BCC-collected sample was labeled on site to show the date, project number, and sample location. The sealed samples were stored and delivered in a chilled, insulated chest with frozen gel-packs to the project laboratory. BCC- collected samples were hand-delivered to Pacific Environmental Laboratory in Beaverton, Oregon, and analyzed for total volatile organic compounds using EPA Method 8240, for total recoverable petroleum hydrocarbons using EPA Method 418.1, and for hydrocarbon identification with a gas chromatography/flame ionization detector. A duplicate analysis of sample W-5 and a travel reagent blank were shipped together via an express carrier to Analytical Technologies for EPA Method 8240 analysis.

HLA groundwater samples collected from VWR wells were obtained by using a stainless steel bailer submerged into the bottom portion of water within the well. Groundwater was poured directly from the top of the bailer into preserved 40mℓ boro-silicate bottles. A Teflon-lined cap (septa) was placed on each bottle, and each bottle was checked to ensure no headspace remained within the sample.

Each HLA-collected sample was labeled, dated, stored, and shipped to the project laboratory in the same manner as BCC-collected samples. Samples were analyzed for volatile organic compounds using EPA Method 8240, for total recoverable petroleum hydrocarbons using EPA Method 418.1, and for hydrocarbon identification with a gas chromatography/flame ionization detector.

Equipment Decontamination

To prevent cross contamination, the water-level probe, the stainless steel bailer (BCC), and the submersible pump (HLA) were to decontaminated between use at each well. BCC also sampled wells in order of increasing volatile concentration based on sample analytical results from October 31, 1990. All wash and rinse water was contained in 5-gallon PVC buckets during decontamination and then transferred to a 55-gallon DOT drum pending proper disposal.

Water-Level Probe Decontamination. Both BCC and HLA water-level probes were decontaminated by spraying a soap solution onto the probe end and then rinsing with de-ionized water. After decontamination, the probes were dried with an absorbent paper towel.

Bailer Decontamination. The BCC stainless steel bailer used for purging Convoy wells was disassembled, submersed in a soap solution, and scrubbed with a stiff polyethylene brush between well samplings. After washing, the bailer parts were rinsed with tap water and then rinsed again with de-ionized water. After rinsing, the bailer was allowed to air dry prior to reuse. A disposable polyethylene bailer was used by BCC to collect the sample from Convoy wells and was discarded after each well sampling. The HLA stainless bailer used to sample the VWR wells was subjected to a hot, high-pressure wash and then rinsed with pressurized steam.

Purging Submersible Pump Decontamination. The 4-inch Gould® submersible pump used by HLA to purge groundwater from VWR wells was decontaminated between each purging event. The pump was disassembled, rinsed with tap water, and sprayed with pressurized steam. During decontamination, the disassembled pump was placed on a wooden pallet atop a blue tarp.

ATTACHMENT 2

Well and Water-Level Elevation Data
Van Waters & Rogers Inc.
Portland, Oregon

Monitoring Well	Date	Time	Depth to Water (feet BTOC)(1)	Top of Casing Elevation (feet MSL)(2)	Groundwater Elevation (feet MSL)
SMW-1	3/28/91	0926	12.58	39.13	26.55
SMW-2	3/28/91	0908	7.67	34.98	27.31
SMW-3(3)	3/28/91	0850	11.10	37.87	26.77
SMW-3	3/29/91	0733	11.08	37.87	26.79
SMW-4	3/28/91	0923	12.29	38.82	26.53
SMW-4	3/29/91	0747	12.29	38.82	26.53
SMW-5	3/28/91	0934	11.35	37.92	26.57
SMW-6	3/28/91	0937	8.62	35.13	26.51
SMW-7	3/28/91	0920	8.09	34.30	26.21
SMW-8	3/28/91	0912	10.75	36.62	25.87
SMW-9(3)	3/28/91	0858	8.41	35.39	26.98
SMW-9	3/29/91	0741	8.42	35.39	26.97
SMW-10(3)	3/28/91	0842	10.48	35.25	24.77
SMW-10	3/29/91	0729	10.47	35.25	24.78
SMW-11	3/28/91	0845	10.93	36.06	25.13
SMW-12	3/28/91	0940	11.50	38.03	26.53
SMW-13	3/28/91	0949	10.16	36.73	26.57
SMW-15	3/28/91	0952	9.82	36.35	26.53
SMW-16(3,4)	3/28/91	0904	7.70	33.10	25.40
SMW-16	3/29/91	0743	6.76	33.10	26.34
SMW-17(3)	3/28/91	0901	7.58	33.84	26.26
SMW-17	3/29/91	0745	7.59	33.84	26.25
SMW-18(3)	3/28/91	0945	10.65	35.85	25.20
SMW-19(3)	3/28/91	0955	10.43	37.05	26.62
SMW-20(3)	3/28/91	1000	10.02	36.36	26.34
SMW-21(3)	3/28/91	0855	7.03	33.78	26.75
SMW-21(5)	3/29/91	0737	7.84	33.78	25.94
DMW-1	3/28/91	0929	14.60	37.33	22.73
DMW-2	3/28/91	0917	11.64	34.30	22.66
DMW-3	3/28/91	0853	12.88	34.93	22.05
EXW-1	3/28/91	0931	12.14	38.64	26.50

Well and Water-Level Elevation Data
Van Waters & Rogers Inc.
Portland, Oregon

Monitoring Well	Date	Time	Depth to Water (feet BTOC)(1)	Top of Casing Elevation (feet MSL)(2)	Groundwater Elevation (feet MSL)
W-1	3/28/91	0829	6.85	32.54	25.69
W-1	3/29/91	0802	6.83	32.54	25.71
W-2	3/28/91	0824	8.08	33.79	25.71
W-2	3/29/91	0804	8.08	33.79	25.71
W-3	3/28/91	0837	7.19	33.13	25.94
W-3	3/29/91	0759	7.20	33.13	25.93
W-4	3/28/91	0820	6.07	32.40	26.33
W-4	3/29/91	0808	6.07	32.40	26.33
W-5	3/28/91	0815	6.28	32.60	26.32
W-5	3/29/91	0806	6.28	32.60	26.32

(1) BTOC = Below top of casing.
(2) Feet MSL = Feet above mean sea level.
(3) Top of casing surveyed on March 28, 1991.
(4) Depth to water considered spurious because of air pressure in well.
(5) Depth to water considered spurious because of well development activities and insufficient water-level recovery.

Barometric Pressure = 30.28 in. Hg

ATTACHMENT 3

Analytical Technologies, Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9104-022

April 11, 1991

Brown & Caldwell
9620 S.W. Barbur Blvd.
Suite 200
Portland, OR 97219-6041

Attention : Jon Sprecher

Project Number : 5154-DO

Project Name : C. NW PDX

On April 3, 1991, Analytical Technologies, Inc., received two water samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Technical Manager

FWG/elf

SAMPLE CROSS REFERENCE SHEET

CLIENT : BROWN & CALDWELL
PROJECT # : 5154-DO
PROJECT NAME : C. NW PDX

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9104-022-1	32991-5-5154	03/29/91	WATER
9104-022-2	TRIP BLANK	N/A	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

ANALYTICAL SCHEDULE

CLIENT : BROWN & CALDWELL
PROJECT # : 5154-DO
PROJECT NAME : C. NW PDX

ANALYSIS	TECHNIQUE	REFERENCE	LAB
VOLATILE ORGANIC COMPOUNDS	GCMS	EPA 8240	R

R = ATI - Renton
SD = ATI - San Diego
T = ATI - Tempe
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

VOLATILE ORGANIC COMPOUNDS
DATA SUMMARY

CLIENT	: BROWN & CALDWELL	DATE SAMPLED	: N/A
PROJECT #	: 5154-DO	DATE RECEIVED	: N/A
PROJECT NAME	: C. NW PDX	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/04/91
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1

COMPOUND	RESULT
ACETONE	<10
BENZENE	<1
BROMODICHLOROMETHANE	<1
BROMOFORM	<5
BROMOMETHANE	<10
2-BUTANONE (MEK)	<10
CARBON DISULFIDE	<1
CARBON TETRACHLORIDE	<1
CHLOROBENZENE	<1
CHLOROETHANE	<1
CHLOROFORM	<1
CHLOROMETHANE	<10
DIBROMOCHLOROMETHANE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHANE	<1
1,1-DICHLOROETHENE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
1,2-DICHLOROPROPANE	<1
CIS-1,3-DICHLOROPROPENE	<1
TRANS-1,3-DICHLOROPROPENE	<1
ETHYLBENZENE	<1
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
METHYLENE CHLORIDE	3 J
STYRENE	<1
1,1,2,2-TETRACHLOROETHANE	<1
TETRACHLOROETHENE	<1
TOLUENE	<1
1,1,1-TRICHLOROETHANE	<1
1,1,2-TRICHLOROETHANE	<1
TRICHLOROETHENE	<1
VINYL ACETATE	<10
VINYL CHLORIDE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-d4	102
TOLUENE-d8	97
BROMOFLUOROBENZENE	99

J = Estimated value.

VOLATILE ORGANIC COMPOUNDS
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: BROWN & CALDWELL	DATE SAMPLED	: N/A
PROJECT #	: 5154-DO	DATE RECEIVED	: N/A
PROJECT NAME	: C. NW PDX	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/04/91
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1

COMPOUND NAME	SCAN NUMBER	ESTIMATED CONCENTRATION

NO NON-HSL COMPOUNDS FOUND > 10% OF NEAREST INTERNAL STANDARD.

VOLATILE ORGANIC COMPOUNDS
DATA SUMMARY

CLIENT	: BROWN & CALDWELL	DATE SAMPLED	: 03/29/91
PROJECT #	: 5154-DO	DATE RECEIVED	: 04/03/91
PROJECT NAME	: C. NW PDX	DATE EXTRACTED	: N/A
CLIENT I.D.	: 32991-5-5154	DATE ANALYZED	: 04/04/91
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1000

COMPOUND	RESULT
ACETONE	<10000
BENZENE	<1000
BROMODICHLOROMETHANE	<1000
BROMOFORM	<5000
BROMOMETHANE	<10000
2-BUTANONE (MEK)	<10000
CARBON DISULFIDE	<1000
CARBON TETRACHLORIDE	<1000
CHLOROBENZENE	<1000
CHLOROETHANE	<1000
CHLOROFORM	<1000
CHLOROMETHANE	<10000
DIBROMOCHLOROMETHANE	<1000
1,1-DICHLOROETHANE	7,800
1,2-DICHLOROETHANE	<1000
1,1-DICHLOROETHENE	<1000
1,2-DICHLOROETHENE (TOTAL)	10,000
1,2-DICHLOROPROPANE	<1000
CIS-1,3-DICHLOROPROPENE	<1000
TRANS-1,3-DICHLOROPROPENE	<1000
ETHYLBENZENE	<1000
2-HEXANONE (MBK)	<10000
4-METHYL-2-PENTANONE (MIBK)	<10000
METHYLENE CHLORIDE	13,000 B
STYRENE	<1000
1,1,2,2-TETRACHLOROETHANE	<1000
TETRACHLOROETHENE	2,100
TOLUENE	6,400
1,1,1-TRICHLOROETHANE	180,000
1,1,2-TRICHLOROETHANE	<1000
TRICHLOROETHENE	1,800
VINYL ACETATE	<10000
VINYL CHLORIDE	<1000
TOTAL XYLENES	<1000

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-d4	108
TOLUENE-d8	102
BROMOFLUOROBENZENE	107

B = Also found in blank.

VOLATILE ORGANIC COMPOUNDS
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: BROWN & CALDWELL	DATE SAMPLED	: 03/29/91
PROJECT #	: 5154-DO	DATE RECEIVED	: 04/03/91
PROJECT NAME	: C. NW PDX	DATE EXTRACTED	: N/A
CLIENT I.D.	: 32991-5-5154	DATE ANALYZED	: 04/04/91
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1000

COMPOUND NAME	SCAN NUMBER	ESTIMATED CONCENTRATION
ETHANE, 1,1,2-TRICHLORO-1,2,2-TRIFLUORO	204	11,000

VOLATILE ORGANIC COMPOUNDS
DATA SUMMARY

CLIENT	: BROWN & CALDWELL	DATE SAMPLED	: N/A
PROJECT #	: 5154-DO	DATE RECEIVED	: 04/03/91
PROJECT NAME	: C. NW PDX	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 04/04/91
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1

COMPOUND	RESULT
ACETONE	<10
BENZENE	<1
BROMODICHLOROMETHANE	<1
BROMOFORM	<5
BROMOMETHANE	<10
2-BUTANONE (MEK)	<10
CARBON DISULFIDE	<1
CARBON TETRACHLORIDE	<1
CHLOROBENZENE	<1
CHLOROETHANE	<1
CHLOROFORM	<1
CHLOROMETHANE	<10
DIBROMOCHLOROMETHANE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHANE	<1
1,1-DICHLOROETHENE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
1,2-DICHLOROPROPANE	<1
CIS-1,3-DICHLOROPROPENE	<1
TRANS-1,3-DICHLOROPROPENE	<1
ETHYLBENZENE	<1
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
METHYLENE CHLORIDE	8 B
STYRENE	<1
1,1,2,2-TETRACHLOROETHANE	<1
TETRACHLOROETHENE	<1
TOLUENE	<1
1,1,1-TRICHLOROETHANE	<1
1,1,2-TRICHLOROETHANE	<1
TRICHLOROETHENE	<1
VINYL ACETATE	<10
VINYL CHLORIDE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-d4	104
TOLUENE-d8	100
BROMOFLUOROBENZENE	101

B = Also found in blank.

VOLATILE ORGANIC COMPOUNDS
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: BROWN & CALDWELL	DATE SAMPLED	: N/A
PROJECT #	: 5154-DO	DATE RECEIVED	: 04/03/91
PROJECT NAME	: C. NW PDX	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 04/04/91
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1

COMPOUND NAME	SCAN NUMBER	ESTIMATED CONCENTRATION
ETHANE, 1,1,2-TRICHLORO-1,2,2-TRIFLUORO	207	13

VOLATILE ORGANIC COMPOUNDS
QUALITY CONTROL DATA

CLIENT : BROWN & CALDWELL
PROJECT # : 5154-DO
PROJECT NAME : C. NW PDX
EPA METHOD : 8240

SAMPLE I.D. : 9103-233-8
DATE ANALYZED : 04/04/91
MATRIX : WATER
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED SAMPLE	% REC	DUP SPIKED SAMPLE	DUP % REC	RPD
1,1-DICHLOROETHENE	<1	50.0	49.9	100	48.2	96	3
TRICHLOROETHENE	<1	50.0	54.4	109	52.6	105	3
BENZENE	<1	50.0	56.0	112	53.4	107	5
TOLUENE	<1	50.0	51.8	104	51.0	102	2
CHLOROBENZENE	<1	50.0	53.3	107	52.1	104	2

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

9[redacted] SW BARBUR BLVD #200 1-(503) 244-7005
PORTLAND OR 97219-6041

CHAIN OF CUSTODY RECORD

BC Log Number 9[redacted]-0[redacted]

Client name: BROWN & CALDWELL
Job number or Purchase Order number: 5154-90
Project name: C. NW PDX
Project manager: JON SPRECHER
Sampler(s): TJH

Analyses required: 8240 Total Vol.; Hazardous sample / Special handling required

Sample number	Date sampled	Time sampled	Matrix Type	Sample description	Number of containers	8240 Total Vol.	Hazardous sample / Special handling required	Remarks
-1	3/29/91		GW	Sample [32991-5-5154]	2	X		
-2	3/29/91	0700	W	[Trip blank] 3-29-91-5154	2	X		

	Signature	Company	Date	Time
Relinquished by	[signature]	BC/PDX Tim Haver	4/2/91	1500
Received by	[redacted] FEDERAL EXPRESS			
Relinquished by	FED X			
Received by	J. Lewis	ATI	4/3/91	1030
Relinquished by				
Received by	ice, seals, umpires no H.S.			

BROWN AND CALDWELL Analytical Laboratories

☐ 1255 Powell Street, Emeryville, CA 94608 (415) 428-2300
☐ 373 South Fair Oaks Avenue, Pasadena, CA 91105 (213) 681-4655

Note: Samples are discarded 30 days after results are reported unless other arrangements are made.
Hazardous samples will be returned to client or disposed of at client expense.

PACIFIC
ENVIRONMENTAL
LABORATORY INC.

9405 S.W. Nimbus Ave. Beaverton, OR 97005 (503) 644-0660
FAX # (503) 644-2202

April 15, 1991

Brown & Caldwell
9620 S.W. Barbur Blvd.
Suite 200
Portland, OR 97219

Attn: Tim Havel

Re: JOB #5154
P.O. #5154
PROJECT - CONVOY
PEL #91-0994

Enclosed is the lab report for your samples which were received on March 29, 1991.

I. Sample Description

Nine Water Samples

The samples were received under a chain of custody.

The samples were received in containers consistent with EPA protocol.

II. Quality Control

No project specific QC was requested. In-house QC data is available upon request.

III. Analytical Results

Test methods may include minor modifications of published methods such as detection limits or parameter lists. Solid and waste samples are reported on an "as received" basis unless otherwise noted.

Compounds not detected are listed under results as ND.

Sincerely,

Howard Holmes
Lab Manager

Howard Boorse
QA/QC Manager

PACIFIC ENVIRONMENTAL LABORATORY INC.

PEL REPORT NUMBER: 91-0994
CLIENT: Brown & Caldwell
JOB REFERENCE: 5154
P.O. NUMBER: 5154
PROJECT: CONVOY
DATE: April 15, 1991
ITEMS: Nine Water Samples

METHOD: Hydrocarbon I.D. by GC/FID
Results in mg/L (ppm)

Sample I.D.	Hydro-carbon	Carbon Range	Comments
W-3	56	C_6-C_{14}	c.
	--	C_{26}-C_{40}	j.
Lab Blank	ND	--	
Detection Limit	0.5	C_6-C_{24}	
Detection Limit	2.5	C_{24}-C_{40}	

c. In the range of gasoline
j. Contains a heavy petroleum product with the carbon range listed. However, the product cannot be quantitated by this method.

↑ Not gasoline is ethanol

METHOD: Total Petro ... per EPA 418.1
Results in mg/L (ppm)

Sample I.D.	TPH
W-3	(*see note)
W-4	ND
W-5	ND
Lab Blank	ND
Detection Limit	0.5

*NOTE: Cannot quantify by infrared spectrometry due to matrix interferences.

PACIFIC ENVIRONMENTAL LABORATORY INC.

PEL REPORT NUMBER: 91-0994
CLIENT: Brown & Caldwell
JOB REFERENCE: 5154
P.O. NUMBER: 5154
PROJECT: CONVOY
DATE: April 15, 1991
ITEMS: Nine Water Samples

METHOD: Volatiles per EPA 8240
Results in ug/L (ppb)

Compound	W-1	SMW-3	Lab Blank	Detection Limit
Acetone	ND	ND	ND	50
Acrolein	ND	ND	ND	100
Acrylonitrile	ND	ND	ND	50
Benzene	ND	ND	ND	5.0
Bromodichloromethane	ND	ND	ND	5.0
Bromoform	ND	ND	ND	5.0
Bromomethane	ND	ND	ND	10
2-Butanone	ND	ND	ND	100
Carbon disulfide	ND	ND	ND	5.0
Carbon tetrachloride	ND	ND	ND	5.0
Chlorobenzene	ND	ND	ND	5.0
Chlorodibromomethane	ND	ND	ND	5.0
Chloroethane	ND	ND	ND	10
Chloroform	ND	ND	ND	5.0
Chloromethane	ND	ND	ND	10
Dibromomethane	ND	ND	ND	5.0
Dichlorobenzenes	ND	ND	ND	5.0
Dichlorodifluoromethane	ND	ND	ND	5.0
1,1-Dichloroethane	41	19	ND	5.0
1,2-Dichloroethane	ND	ND	ND	5.0
1,1-Dichloroethene	ND	ND	ND	5.0
cis-1,2-Dichloroethene	ND	160	ND	5.0
trans-1,2-Dichloroethene	ND	ND	ND	5.0
1,2-Dichloropropane	ND	ND	ND	5.0
cis-1,3-Dichloropropene	ND	ND	ND	5.0
trans-1,3-Dichloropropene	ND	ND	ND	5.0
Ethanol	ND	ND	ND	100
Ethylbenzene	ND	ND	ND	5.0
2-Hexanone	ND	ND	ND	50
Methylene chloride	ND	ND	ND	5.0
4-Methyl-2-pentanone	ND	ND	ND	50
Styrene	ND	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	5.0
Tetrachloroethene	ND	44	ND	5.0
Toluene	ND	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	ND	5.0
1,1,2-Trichloroethane	ND	ND	ND	5.0
Trichloroethene	ND	41	ND	5.0
Trichlorofluoromethane	ND	ND	ND	5.0
1,2,3,-Trichloropropane	ND	ND	ND	5.0
Vinyl acetate	ND	ND	ND	50
Vinyl chloride	ND	ND	ND	10
Xylene	ND	ND	ND	5.0

PACIFIC ENVIRONMENTAL LABORATORY INC.

PEL REPORT NUMBER: 91-0994
CLIENT: Brown & Caldwell
JOB REFERENCE: 5154
P.O. NUMBER: 5154
PROJECT: CONVOY
DATE: April 15, 1991
ITEMS: Nine Water Samples

METHOD: Volatiles per EPA 8240
Results in ug/L (ppb)

Compound	SMW-9	SMW-21	SMW-16	Detection Limit
Acetone	ND	ND	ND	50
Acrolein	ND	ND	ND	100
Acrylonitrile	ND	ND	ND	50
Benzene	ND	ND	11	5.0
Bromodichloromethane	ND	ND	ND	5.0
Bromoform	ND	ND	ND	5.0
Bromomethane	ND	ND	ND	10
2-Butanone	ND	ND	ND	100
Carbon disulfide	ND	ND	ND	5.0
Carbon tetrachloride	ND	ND	ND	5.0
Chlorobenzene	ND	ND	ND	5.0
Chlorodibromomethane	ND	ND	ND	5.0
Chloroethane	ND	ND	ND	10
Chloroform	ND	ND	ND	5.0
Chloromethane	ND	ND	ND	10
Dibromomethane	ND	ND	ND	5.0
Dichlorobenzenes	ND	ND	ND	5.0
Dichlorodifluoromethane	ND	ND	ND	5.0
1,1-Dichloroethane	12	27	ND	5.0
1,2-Dichloroethane	ND	ND	ND	5.0
1,1-Dichloroethene	ND	ND	ND	5.0
cis-1,2-Dichloroethene	21	18	ND	5.0
trans-1,2-Dichloroethene	ND	ND	ND	5.0
1,2-Dichloropropane	ND	ND	ND	5.0
cis-1,3-Dichloropropene	ND	ND	ND	5.0
trans-1,3-Dichloropropene	ND	ND	ND	5.0
Ethanol	ND	ND	ND	100
Ethylbenzene	ND	ND	ND	5.0
2-Hexanone	ND	ND	ND	50
Methylene chloride	ND	ND	ND	5.0
4-Methyl-2-pentanone	ND	ND	ND	50
Styrene	ND	ND	ND	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	5.0
Tetrachloroethene	ND	ND	ND	5.0
Toluene	ND	ND	ND	5.0
1,1,1-Trichloroethane	ND	ND	ND	5.0
1,1,2-Trichloroethane	ND	ND	ND	5.0
Trichloroethene	ND	ND	ND	5.0
Trichlorofluoromethane	ND	ND	ND	5.0
1,2,3,-Trichloropropane	ND	ND	ND	5.0
Vinyl acetate	ND	ND	ND	50
Vinyl chloride	ND	ND	ND	10
Xylene	ND	ND	ND	5.0

PACIFIC ENVIRONMENTAL LABORATORY INC.

PEL REPORT NUMBER: 91-0994
CLIENT: Brown & Caldwell
JOB REFERENCE: 5154
P.O. NUMBER: 5154
PROJECT: CONVOY
DATE: April 15, 1991
ITEMS: Nine Water Samples

METHOD: Volatiles per EPA 8240
Results in ug/L (ppb)

Compound	W-2	W-3	Detection Limit
Acetone	ND	ND	250
Acrolein	ND	ND	500
Acrylonitrile	ND	ND	250
Benzene	ND	ND	25
Bromodichloromethane	ND	ND	25
Bromoform	ND	ND	25
Bromomethane	ND	ND	50
2-Butanone	ND	910	500
Carbon disulfide	ND	ND	25
Carbon tetrachloride	ND	ND	25
Chlorobenzene	ND	ND	25
Chlorodibromomethane	ND	ND	25
Chloroethane	ND	ND	50
Chloroform	ND	ND	25
Chloromethane	ND	ND	50
Dibromomethane	ND	ND	25
Dichlorobenzenes	ND	ND	25
Dichlorodifluoromethane	ND	ND	25
1,1-Dichloroethane	1,300	ND	25
1,2-Dichloroethane	ND	ND	25
1,1-Dichloroethene	ND	ND	25
cis-1,2-Dichloroethene	160	ND	25
trans-1,2-Dichloroethene	ND	ND	25
1,2-Dichloropropane	ND	ND	25
cis-1,3-Dichloropropene	ND	ND	25
trans-1,3-Dichloropropene	ND	ND	25
Ethanol	ND	68,000	500
Ethylbenzene	ND	ND	25
2-Hexanone	ND	ND	250
Methylene chloride	ND	ND	25
4-Methyl-2-pentanone	ND	ND	250
Styrene	ND	ND	25
1,1,2,2-Tetrachloroethane	ND	ND	25
Tetrachloroethene	ND	ND	25
Toluene	ND	ND	25
1,1,1-Trichloroethane	ND	ND	25
1,1,2-Trichloroethane	ND	ND	25
Trichloroethene	ND	ND	25
Trichlorofluoromethane	ND	ND	25
1,2,3,-Trichloropropane	ND	ND	25
Vinyl acetate	ND	ND	250
Vinyl chloride	ND	ND	50
Xylene	ND	ND	25

PACIFIC ENVIRONMENTAL LABORATORY INC.

PEL REPORT NUMBER: 91-0994
CLIENT: Brown & Caldwell
JOB REFERENCE: 5154
P.O. NUMBER: 5154
PROJECT: CONVOY
DATE: April 15, 1991
ITEMS: Nine Water Samples

METHOD: Volatiles per EPA 8240
Results in ug/L (ppb)

Compound	W-4	W-5	Detection Limit
Acetone	ND	ND	25,000
Acrolein	ND	ND	50,000
Acrylonitrile	ND	ND	25,000
Benzene	ND	ND	2,500
Bromodichloromethane	ND	ND	2,500
Bromoform	ND	ND	2,500
Bromomethane	ND	ND	5,000
2-Butanone	ND	ND	50,000
Carbon disulfide	ND	ND	2,500
Carbon tetrachloride	ND	ND	2,500
Chlorobenzene	ND	ND	2,500
Chlorodibromomethane	ND	ND	2,500
Chloroethane	ND	ND	5,000
Chloroform	ND	ND	2,500
Chloromethane	ND	ND	5,000
Dibromomethane	ND	ND	2,500
Dichlorobenzenes	ND	ND	2,500
Dichlorodifluoromethane	ND	ND	2,500
1,1-Dichloroethane	14,000	9,500	2,500
1,2-Dichloroethane	ND	ND	2,500
1,1-Dichloroethene	ND	ND	2,500
cis-1,2-Dichloroethene	14,000	7,300	2,500
trans-1,2-Dichloroethene	ND	ND	2,500
1,2-Dichloropropane	ND	ND	2,500
cis-1,3-Dichloropropene	ND	ND	2,500
trans-1,3-Dichloropropene	ND	ND	2,500
Ethanol	ND	ND	50,000
Ethylbenzene	ND	ND	2,500
2-Hexanone	ND	ND	25,000
Methylene chloride	ND	ND	2,500
4-Methyl-2-pentanone	ND	ND	25,000
Styrene	ND	ND	2,500
1,1,2,2-Tetrachloroethane	ND	ND	2,500
Tetrachloroethene	ND	ND	2,500
Toluene	4,900	4,900	2,500
1,1,1-Trichloroethane	130,000	74,000	2,500
1,1,2-Trichloroethane	ND	ND	2,500
Trichloroethene	12,000	11,000	2,500
Trichlorofluoromethane	ND	ND	2,500
1,2,3,-Trichloropropane	ND	ND	2,500
Vinyl acetate	ND	ND	25,000
Vinyl chloride	ND	ND	5,000
Xylene	ND	ND	2,500
Trichlorotrifluoroethane	20,000	ND	2,500

PACIFIC ENVIRONMENTAL LABORATORY INC.

PEL REPORT NUMBER: 91-0994
CLIENT: Brown & Caldwell
JOB REFERENCE: 5154
P.O. NUMBER: 5154
PROJECT: CONVOY
DATE: April 15, 1991
ITEMS: Nine Water Samples

8240 Surrogate Recoveries (%)

Sample I.D.	1,2-Dichloro-ethane-d4	Toluene-d8	4-Bromo-fluorobenzene
W-1	95	104	101
W-2	89	100	104
W-3	88	96	103
W-4	92	98	98
W-5	91	105	99
SMW-3	93	100	98
SMW-9	93	102	100
SMW-21	91	100	102
SMW-16	89	97	104

pacific environmental laboratory inc.

9405 S.W. Nimbus Ave.
Beaverton, OR 97005
(503) 644-0660
Fax (503) 644-2202

CHAIN OF CUSTODY RECORD

COMPANY: BROWN & CALDWELL
PROJECT MANAGER: Jim HAVEL
COLLECTED BY: TJH

PROJECT NAME: CONVOY
PROJECT NUMBER: 5154
P.O. NUMBER: SAME

LAB PROJECT NO.: 91-0994
RUSH ☐ YES ☒ NO

COMMENTS: Samples W-4 and 5 may be contain high levels of VOC's

SAMPLES RECEIVED AT 4°C ☑ YES ☐ NO
SAMPLES IN APPROPRIATE CONTAINERS ☑ YES ☐ NO

PROVIDE VERBAL RESULTS ☐ YES ☐ NO
PROVIDE FAX RESULTS ☐ YES ☐ NO

PEL NO.	SAMPLE I.D.	DATE	TIME	SAMPLE DESCRIPTION	MATRIX: SOIL	MATRIX: WATER	MATRIX: OTHER	NUMBER OF CONTAINERS	ANALYSES TO BE PERFORMED: HALOGENATED VOLATILES 601/8010	BTEX 602/8020	VOLATILES 624/8240	HCID/FUEL SCAN GC/FID	TPH - GASOLINE	TPH - DIESEL	TPH - 418.1	SEMI-VOLATILES 625/8270	PCB's 608/8080	CHLORINATED PESTICIDES 608/8080	TCLP (8) METALS	REMARKS
1	W-1	3/29	1029	GW from well		X					X				X					
2	W-2	3/29	1115	"		X					X				X					
3	W-3	3/29	0952	"		X					X				X					
4	W-4	3/29	1323	"		X					X				X					
5	W-5	3/29	1350	"		X					X				X					
6	SMW-3	3/29	1448	"		X					X				X					Samples 1A & 2 TJH
7	SMW-9	3/29		"		X					X				X					" "
8	SMW-21	3/29	1503	"		X					X				X					Samples 1A & 2 TJH
9	SMW-16	3/29	1110	"		X					X				X					" "

ALL SAMPLES WILL BE DISPOSED OF 30 DAYS AFTER RECEIPT

RELINQUISHED BY	COMPANY	DATE/TIME	RECEIVED BY	COMPANY
	BROWN & CALDWELL	3/29/91 1705	05 5pm 3-29-91	PEL
RELINQUISHED BY	COMPANY	DATE/TIME	RECEIVED BY	COMPANY
RELINQUISHED BY	COMPANY	DATE/TIME	RECEIVED BY	COMPANY